

Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Dardenne Creek

Waterbody Segment at a Glance:

Counties:	Warren St. Charles
Nearby Cities:	New Melle, Cottleville, St. Peters and St. Charles
Length of Impairment:	10 miles
Pollutants:	Unknown
Pollutant Sources:	Urban and Rural Nonpoint Sources



State map showing location of watershed

TMDL Priority Ranking: Medium

Description of the Problem

Beneficial uses of Dardenne Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption
- Boating and Canoeing

Use that is impaired

- Protection of Warm Water Aquatic Life

Standards that apply

- All waterbodies in Missouri are protected by the *general* criteria (standards) contained in Missouri's Water Quality Standards (WQS), 10 CSR20-7.031(3). These criteria (also called *narrative* criteria) list substances that all waters "shall be free from". For example, points (3)(A), (C) and (G)state:
 - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
 - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
 - Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

Background Information and Water Quality Data

The U. S. Environmental Protection Agency (EPA) placed Dardenne Creek on the 2002 303(d) list for unknown pollutants. EPA believes that the results and conclusions from the studies conducted by the

Department of Natural Resources between 1998 and 2000 (see Tables 1 and 2 below) adequately demonstrate that Dardenne Creek is impaired.

Aquatic Invertebrate sampling by the department in the spring of 2000 and the spring and fall of 2002 indicates poor water quality and/or poor aquatic habitat conditions in much of Dardenne Creek. This data is summarized in Table 1. The invertebrate scores used in this table compare the invertebrate community of the stream to the invertebrate community in a reference (high quality) stream in the same area of the state. Scores of 20-16 indicate a healthy invertebrate community.

Table 1. Invertebrate Scores and Percent Fine Sediment Deposition in Dardenne Creek			
	Dardenne Cr. upstream of Busch CA	Dardenne Cr. in Vicinity of Busch CA	Dardenne Cr. downstream of Hwy 40
Inv. Score Spring 2000	10-14	16-20	0-8
Inv. Score Spring 2002	8-12	14	
Inv. Score Fall 2002	10-16	16	
% Fine Sediment Deposition	23-71	70-100	

Source: Missouri Department of Natural Resources

The poorer invertebrate scores below Highway 40 probably reflect the problems related to urbanization of that portion of the watershed.

Results of cooperative water quality monitoring program of Dardenne Creek by the Departments of Natural Resources and Conservation are summarized below.

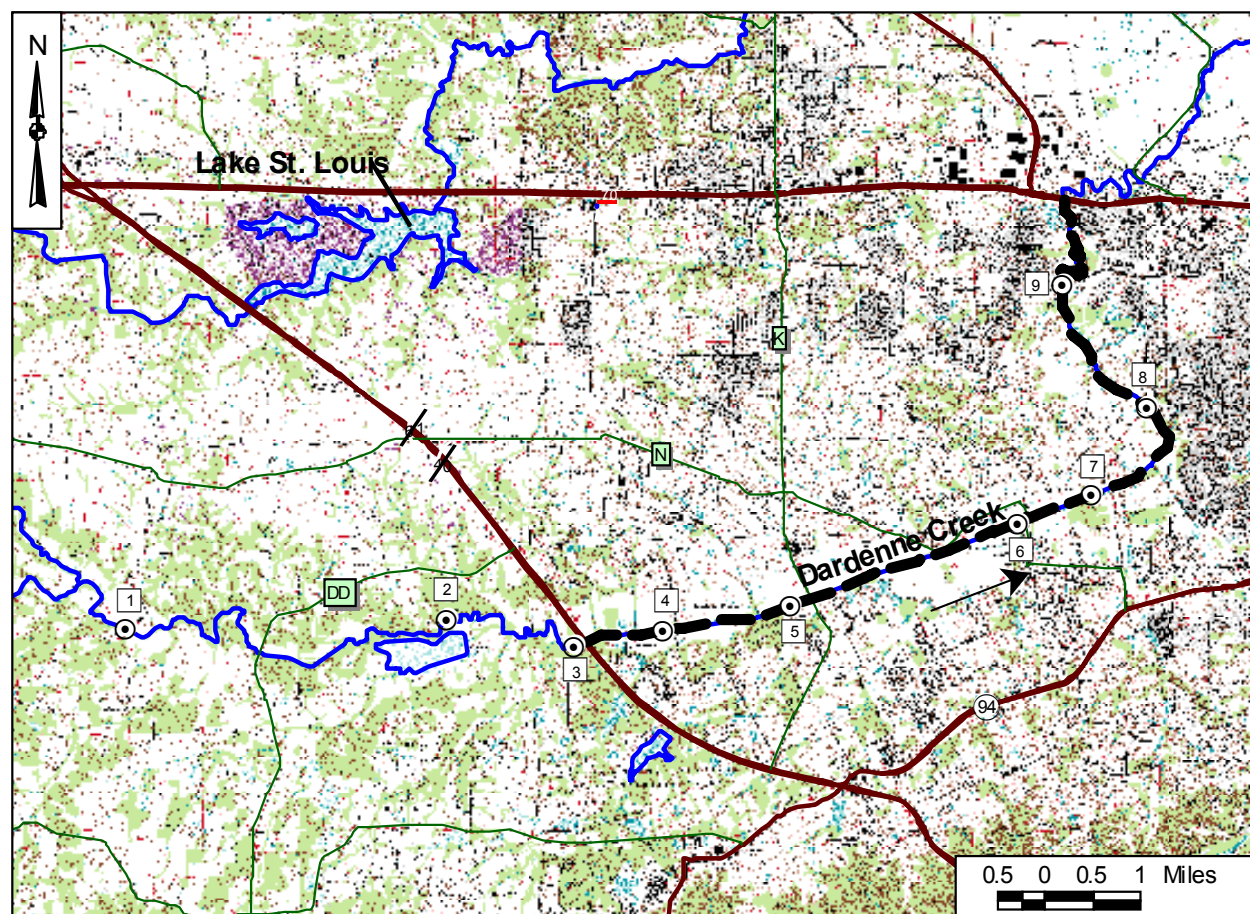
Table 2. Mean Water Quality Data for Dardenne Creek 1998-2003							
	Holt Rd.	Hwy Z	Hopewell Rd.	Hwy DD	At Busch CA	Hwy N	Hwy C
Water Temp. (C)	16	20	17	14	21	20	17.5
Dissolved Oxygen (mg/L)	11.9	7.1	10.3	8.6	7.0	8.2	9.4
Conductivity (umhos/cm)	440	414	290	339	334	389	445
Organic+NH3N (mg/L)		0.48	0.69	0.36	0.62	0.98	1.08
NH3N (mg/L)	<0.05	0.06	0.13	<0.05	<0.05	<0.05	<0.05
NO2+NO3N	0.35	0.17	0.47	0.23	0.22	0.25	0.42
Total Phosphorus (mg/L)	0.03	0.08	0.13	0.08	0.11	0.18	0.17
Volatile Susp. Solids (mg/L)		3.7	5.8		7.6		
Turbidity (NTU)		19.5	30		39.6		
Fecal Coliform Bacteria (col/100 ml)			59		104	145	394

Source: Missouri Department of Natural Resources, Missouri Department of Conservation

Over the last several years, Missouri Volunteer Quality Monitoring monitors have been collecting data at nine sites along Dardenne Creek (see map below). In an effort to better understand the stream, the

last three years of available volunteer data have been compiled and summarized (see table below). Volunteers sampled the creek for temperature (C°), dissolved oxygen (DO), biological oxygen demand (BOD), nitrates (NO₃), ammonia (NH₃), phosphate (PO₄), specific conductance (SC), total solids (TS), total dissolved solids (TDS), turbidity (TURB), pH, and fecal coliform (FC). Missouri Water Quality Monitoring Volunteer Macroinvertebrate Water Quality Ratings (WQRate) were also included and are an indication of the diversity of macroinvertebrates present. The results of this sampling are discussed below.

Dardenne Creek with Sampling Sites, Warren and St. Charles Counties, Missouri



--- Impaired Segment → Direction of Flow

Table 3. Results of Volunteer Water Quality Monitoring: Mean Water Quality Data for Dardenne Creek

Location	WQRate	Temp	DO	BOD	NO ₃	NH ₃	PO ₄	SC	TS	TDS	TURB	pH*	FC**
		C	mg/l	mg/l	mg/l	mg/l	Mg/l	us	mg/l	mg/l	NTU	su	cfu
1. Hopewell Road	26							469	802.9	176	8.8		
2. Busch Conservation Area		8.3	8.4	4.5	0.36	0.52	0.49	337			37.2	7.2	99
3. Highway 40	21	9.2	8.7	3.0	0.34	0.65	0.79	406	358.0		8.9	7.7	84
4. Henning Road		12.8	9.8	1.5	0.14	0.57	0.86	390			10.8	7.6	33

5. Highway K		9.3	7.0	3.0	1.79	0.75	0.29	630	270.6	242	22.5	7.7	203
6. Highway N		11.1	7.4	6.8	0.72	0.79	1.07	448	1108.0		22.7	7.5	20
7. Upstream of Mid-Rivers Mall	18.5	9.4	9.8	7.0	0.30	0.38	0.50	362	24.0		37.5	8.0	580
8. Downstream of Mid-Rivers Mall		9.3	9.2	4.2	0.24	0.22	0.50	498	232.0		22.6	7.8	227
9. Mexico Road		10.4	9.7	4.7	0.20	0.47	0.68	447			110.5	7.2	352
*Median Value													
**Geometric Mean													

Water Quality Rating: Volunteer Water Quality Invertebrate Ratings were given at three sites, and a declining trend can be seen in a downstream direction. The Water Quality Rating at Hopewell Road in 2001 was 26, a score that indicates excellent water quality. The Water Quality Rating at Highway 40 in 2001 was 21, indicating relatively good water quality. Water Quality Ratings were given upstream of Mid-Rivers Mall in 1998 and 2001. In 1998, the score was 16, indicating fair water quality, but the Water Quality Rating at the same site in 2001 was 21, similar to the score at Highway 40. This Water Quality Rating is rather forgiving, and the limited amount of ratings makes it difficult to pinpoint a particular problem. In addition, there is no direct association between Water Quality Ratings and Missouri Water Quality Standards. Although this information does provide some insight, it could not be used to place Dardenne Creek on the Missouri 303(d) list. However, EPA placed Dardenne Creek on the 2002 303(d) list based on department studies.

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